

# Modern Concepts of Cardiovascular Disease

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## THE LONG-RANGE CARE IN CASES OF MYOCARDIAL INFARCTION AND ANGINA PECTORIS

Discussion of this subject presupposes acceptance of the following thesis: Angina pectoris and myocardial infarction have the same pathogenesis, namely, sclerosis of one or more of the coronary arteries. Only broad principles of treatment can be outlined, since problems differ greatly from case to case. Furthermore, since the course of the disease often is unpredictable, readjustments in the program may be necessary from time to time.

### Physical Activity

The patient with established angina of effort does not require rest in bed. In fact, moderate exercise, such as leisurely walking on level footing, and not enough of it to produce angina, probably is preferable because it may promote the development of collateral coronary circulation. The patient usually knows how far he can walk before angina occurs and he should be instructed to rest for a few minutes before he reaches that point and before he proceeds farther. The patient must be warned never to continue walking when he has an anginal attack. He should always stand or sit until the attack wears off.

If at any time a prolonged and severe attack of pain should occur, which the patient easily recognizes as different from that to which he is accustomed, exercise must be abruptly curtailed. Theoretically, a period of several weeks of rest in bed is indicated, but this is often impracticable. However, at least a week of rest in bed should be required. The temperature should be recorded each afternoon, the leukocyte count and sedimentation rate determined thirty-six hours after the attack and an electrocardiogram made on the second and sixth days after the attack. If, at the end of the week, change in any of these factors has not occurred, the patient may be allowed out of bed, in his room, for another week. Should nothing further develop, normal activity may be resumed gradually over the next month. If at any time during this period another attack occurs, more prolonged rest in bed should be instituted. Many times, however, nothing further happens for a long time and, under such circumstances, if the patient is forced to be inactive, often he becomes restless and he may lose confidence in the physician.

These same principles apply to a patient whose angina of effort becomes progressively more severe and more frequent, whose pain begins to appear when he is at rest, or whose angina suddenly appears or recurs after recovery from myocardial infarction.

In general, then, the patient should be encouraged gradually to resume activity but, at all times, within the limits of his tolerance. This is especially important in the months following the acute episode. Development of complications, especially congestive heart failure, would call for further restrictions and the methods usually employed under such circumstances. Whether resumption of the previous occu-

pation is allowed, depends on these and other factors. A highly nervous temperament, severe hypertension, or angina pectoris induced by slight exertion may make retirement from business or a change of occupation advisable.

### Psychotherapy and routine of living

It would be trite to set down in detail the principles of psychotherapy for patients with disease of the coronary arteries. In spite of the gravity of the disease, many adjust well to it. A few give way to anxiety neurosis. To intelligent patients, the physician must explain the nature of the ailment, pointing out, however, nature's wonderful method of utilizing and building up the collateral circulation, the fact that a small scar in the heart muscle may not seriously impair its function and the growing knowledge that the patient has a chance for a number of years of happy living. As Barnes<sup>1</sup> stated, "Whatever the relation of coronary sclerosis and stress of living may be, the fact remains that coronary occlusion and advanced coronary sclerosis occur frequently in those who have driven themselves to the breaking point. Many of these patients are grievously tired. A prolonged period of rest restores shattered nerves and enables the patient to relax as he has not done in years. He begins to look at himself without emotion and to see the enormity of his past mistakes. He then resolves that on resumption of activity he will adhere to a sensible program of living. Such a patient evolves a philosophy of contentment with a lower level of activity which is the best portent that he will survive and enjoy a considerable period of future happiness and usefulness."

When and if work is resumed, with responsibility reduced to the possible minimum, a noontime period of recumbency of a half hour to an hour, complete relaxation after working hours and nine or ten hours of rest in bed at night are important. Smoking should be abandoned. The drinking of two or three cocktails or highballs is permissible and even desirable, however, provided whiskey is well tolerated, that is, provided it does not cause giddiness or mental abandon. Many investigators have demonstrated the effect of smoking on the peripheral vessels, and one<sup>2</sup> of the latest studies has supplied evidence that arteriosclerosis obliterans and thrombosis are of more common occurrence among smokers than among nonsmokers. The vasodilating effect of alcohol, on the other hand, is well known.

Temperance in eating is important and at least a half hour of relaxation in a chair after meals should be advised. Theoretically, a diet low in cholesterol is indicated. Excessive bodily poundage should be gradually eliminated. A day or two in bed once or twice a month is helpful, more perhaps for the mental quietude it engenders than for any important direct effect it has on the coronary circulation. Sexual intercourse, if indulged in, should be performed in a

leisurely fashion. Straining at stool and venturing out in windy, cold or stormy weather should be avoided.

### Use of drugs

The nitrites are still drugs of great value for the anginal attack. They are of questionable usefulness, however, and may even be harmful, in attacks of so-called coronary insufficiency, that is, insufficiency of a more serious order than that which causes angina of effort. Nitroglycerin (glyceryl trinitrate) in doses of 1/200 grain (.00032 gram) dissolved under the tongue remains the drug of choice for the anginal attack. The tablets should be fresh and preferably first crushed by the teeth. If the patient anticipates the necessity for more walking or excitement than is usual for him, he may take a tablet of erythrol tetranitrate ( $\frac{1}{4}$  or  $\frac{1}{2}$  grain; 0.016 or 0.032 gram) fifteen minutes beforehand, or one of mannitol hexanitrate ( $\frac{1}{2}$  or 1 grain; 0.032 or 0.065 gram) thirty minutes in advance. The effect of the former lasts about three hours; that of the latter, four to five hours.

The prolonged pain and various degrees of circulatory collapse associated with acute attacks of coronary insufficiency may require administration of opiates for relief. However, prompt response frequently is obtained by administration of a high concentration of oxygen, or whiskey, or both. The initial dose of morphine usually should be  $\frac{1}{4}$  grain (0.016 gram). In severe cases, aminophylline may be administered intravenously in doses of 3 $\frac{1}{2}$  to 7 $\frac{1}{2}$  grains (0.25 to 0.482 gram) every four hours for three or four doses if the symptoms continue. Likewise, papaverine hydrochloride may be injected subcutaneously in doses of 1 $\frac{1}{2}$  grains (0.1 gram) every three or four hours. Whether such drugs as heparin and dicumarol should be used routinely, in the hope of preventing or abating thrombosis, is unsettled at present.

The purine drugs are widely used on the assumption that they increase blood flow in the coronary arteries, but their actual value in the continuous treatment of sclerosis of the coronary arteries is still debatable. Since the preponderance of evidence is in their favor, they probably should be used unless and until more knowledge shows them to be of small value. The four preparations most widely used are theobromine sodium acetate (thesodate), 3 $\frac{1}{4}$  or 7 $\frac{1}{2}$  grains (0.25 or 0.482 gram) per dose, theobromine sodium salicylate (diuretin), 7 $\frac{1}{2}$  to 15 grains (0.482 to 1 gram) per dose, theobromine calcium salicylate (theocalcin), 7 $\frac{1}{2}$  grains (0.482 gram) per dose, and theophylline ethylenediamine (aminophylline, euphylline, thephyldine, or metaphyllin), 1 $\frac{1}{2}$  to 3 grains (0.1 to 0.2 gram) per dose, after meals and at bedtime. These drugs, as well as erythrol tetranitrate and mannitol hexanitrate, are marketed alone or in combination with phenobarbital,  $\frac{1}{4}$  grain (0.016 gram) for the smaller dosages and  $\frac{1}{2}$  grain (0.032 gram) for the larger. The addition of the phenobarbital, the most valuable of the sedatives, is preferable except in the rare cases in which drowsiness is too pronounced.

Recently Raab<sup>3</sup> has advocated the use of thiouracil for the purpose of decreasing the rate of metabolism and thereby relieving the heart of some of its burden.

He reported excellent results. However, Di Palma and MaGovern<sup>4</sup> have not had such happy experience. They had to abandon the treatment in four of eight cases without giving any relief. The other four were benefited for a while only. The authors concluded that the drawbacks—toxicity, necessity for close supervision, failure to lower metabolic rate when it is low to start with, tendency toward retention of water and necessity for continuous treatment—were sufficient to limit its use in cases in which the basal metabolic rate is elevated to begin with, and perhaps as a therapeutic test with a view toward thyroidectomy. On the other hand, Lerman and White<sup>5</sup> recently have reported beneficial effects from the administration of small doses of preparations of thyroid to twenty-one patients. Increasing the metabolic rate is accompanied by general vasodilatation, which may decrease the work of the heart even though the cardiac output per minute is increased.

### Other therapeutic measures

Surgical treatment has been employed for angina pectoris since 1916, when Jonnesco performed cervical sympathectomy. Later, J. C. White resected the upper sympathetic dorsal nerve root connections with success in obstinate cases. Less drastic was the injection (Swetlow) of alcohol into the first five thoracic dorsal nerve roots. This procedure requires considerable skill and, according to P. D. White,<sup>6</sup> "should be reserved for particularly obstinate or crippled cases of angina pectoris." Raney, in 1939, relieved eleven patients by means of section of the preganglionic fibers. This procedure interrupts influences "that would tend to cause coronary constriction without interfering with the warning signal of coronary insufficiency itself." Total thyroidectomy, once advocated, has been largely discarded. Still experimental are the procedures of pericardial implantation of subpectoral muscle or omentum, establishment of pericardial adhesions and ligation of the great cardiac vein.

Roentgen therapy applied over the upper six thoracic sympathetic rami communicantes has been reported to be beneficial but has not gained wide acceptance. The same is true of radiation of the suprarenal glands.

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